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SMITHSONIAN MISCELLANEOUS COLLECTIONS.

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CATALOGUE

OF

MINERALS,

WITH THEIR FORMULAS, ETC.

PREPARED FOR THE SMITHSONIAN INSTITUTION.

BY

— T. EGLESTON



WASHINGTON:
SMITHSONIAN INSTITUTION:
JUNE, 1863.

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ADVERTISMENT.



The following Catalogue of Mineral Species has been prepared by Mr. Egleston, at the request of the Institution, for the purpose of facilitating the arranging and labelling of collections, and the conducting of exchanges, as well as of presenting in a compact form an outline of the science of mineralogy as it exists at the present day.

In labelling collections it is considered important to give the chemical composition as well as the names, and hence the formulæ have been added.

Some doubt was at first entertained as to the system of classification which ought to be adopted; but after due consideration it was concluded to make use of that followed by Professor Dana, in the last edition of his Manual of Mineralogy. Whatever difference of opinion may exist as to the best classification, the one here employed is that which will be most generally adopted in this country, on account of the almost exclusive use of Professor Dana's excellent Manual.

The Institution is under obligations to Prof. Dana, Prof. Brush, Dr. Gent, and other gentlemen, for their assistance in perfecting the work, and carrying it through the press.

Copies of the Catalogue, printed on one side only, to be cut apart for labels, can be furnished on application.

JOSEPH HENRY,
Secretary S. I.

SMITHSONIAN INSTITUTION,
June, 1863.

INTRODUCTION.

To render the present Catalogue of Minerals more than a mere enumeration of names, the formulæ expressing the chemical composition of the mineral and the system in which it crystallizes, as far as at present understood, have been given. The classification adopted is Dana's, as published in the fourth edition of his Mineralogy. Some species that have proved not to be well founded have been omitted, and many since published have been added. Of these latter species, some must be considered as having only a provisional place in the series, and it is probable that others will ultimately be dropped altogether. In making the additions and corrections, the Supplements to Dana's Mineralogy, which have appeared from time to time in *Silliman's Journal*, have always been consulted, and the most probable formulæ, as deduced by recent investigations, have been selected. In a few instances a change has been made in the place of a species where a more thorough examination has thrown light upon the true nature of the mineral or where it has been found that the system of crystallization had previously been incorrectly given. *Faujasite*, p. 19, was formerly considered as *dimetric*, it has lately been proved to be *monometric*, and it has therefore been placed among the monometric zeolites. The formula for *Euclase* is the one given by Rose; Damour's analysis gave water, and the formula $2\text{Ba Si}_3 + 3\text{Al Si}_3 + \text{H}_2\text{O}$. Rammelsberg has recently discovered the existence of protoxides in *Staurolite*, and proposes as a general formula $(\text{R}, \text{R}') + \text{Si}^{\text{IV}}$. In the formula for *Opal*, water has not been written,

as it is found in very variable quantities, and is not considered as essential. For what is known of the species added to the list of organic compounnds, see the 2d, 5th, 6th, and 7th Supplements to Dana's Mineralogy. For changes in the systems of crystallization, Des-Cloizeaux has generally been the authority.

A table of the symbols used, with illustrations of the meaning of the formulæ, are given on p. vii., and on p. ix. will be found a table relating to the systems of crystallization. In the first column are the simple forms from which all the others, of the same system, are derived; in the second the description of the axes of these simple forms, and in the others the nomenclature that has been adopted by the authors whose names stand at the head of the column. The axes of a crystal are imaginary lines drawn through its centre and about which it is symmetrical. It has been found most convenient to refer to the systems of crystallization by the numbers which have been placed on the left hand of the table.

An asterisk following the name of a mineral, as *Gold*,* p. 1, denotes that it has been found in the United States. A dagger, as *Danburite*,† p. 14, denotes that it has been found in the United States only. The other minerals have not, so far as is known, been found in this country.

T. EGLESTON.

NEW YORK, May, 1863.

CHEMICAL SYMBOLS.

Ag. (Argentum)	Silver.	Mg.	Magnesium.
Al.	Aluminum.	Mn.	Manganese.
Aq.	Water.	Mo.	Molybdenum.
As.	Arsenic.	N.	Nitrogen.
Au. (Aurum)	Gold.	Na. (Natrum)	Sodium.
B.	Boron.	Ni.	Nickel.
Ba.	Barium.	O.	Oxygen.
Be. (Beryllium)	Glucoinum.	Os.	Osmium.
Bi.	Bismuth.	P.	Phosphorus.
Br.	Bromine.	Pb. (Plumbum)	Led.
C.	Carbon.	Pd.	Palladium.
Ca.	Calcium.	Pt.	Platinum.
Cb.	Columbium.	Rd.	Rhodium.
Cd.	Cadmium.	Ru.	Ruthenium.
Ce.	Cerium.	S.	Sulphur.
Cl.	Chlorine.	Sb. (Stibium)	Antimony.
Co.	Cobalt.	Se.	Selerium.
Cr.	Chromium.	Si.	Silicium.
Cu. (Cuprum)	Copper.	Su. (Stannum)	Tin.
D.	Didymium.	Sr.	Strontium.
F.	Fluorine.	Ta.	Tantalum.
Fe. (Ferrum)	Iron.	Tb.	Terbium.
H.	Hydrogen.	Te.	Tellurium.
Hg. (Hydrargyrum)	Mercury.	Th.	Thorium.
I.	Iodine.	U.	Uranium.
Ir.	Iridium.	V.	Vanadium.
K. (Kaliump)	Potassium.	W. (Wolframium)	Tungsten.
La.	Lanthanum.	Y.	Yttrium.
Li.	Lithium.	Zn.	Zinc.
M.	Mellie Acid.	Zr.	Zirconium.

NOTE.—R is an indefinite symbol, and may refer to any one or more of the symbols in the table. In the formulae given in the Catalogue the dots over the symbols indicate atoms of oxygen—thus, Fe indicates one atom

of Iron combined with one of Oxygen. A dashed letter indicates a double atom of the substance—thus, Fe means two atoms of Iron combined with three of Oxygen. A general formula has sometimes been given when one or more of the elements are replaced by others in variable proportions, or for species which include several important varieties, as Melinophane, p. 12, Allanite and others, p. 14, Pyroxene, p. 11, Amphibole and Peridot, p. 12, &c. In these formulae R represents all the bases composed of one atom of an element and one of Oxygen, and R^3 all those composed of two atoms of an element and three of Oxygen. Thus the general formula for the family of the Chlorites, p. 17, is $5R^3\text{Si}_2^3 + 3R\text{Si}_2^3 + 12\text{H}_2\text{O}$, which means that the mineral contains five atoms of compound made up of three atoms of proto-base combined with three-quarters of an atom of silicic acid, plus three atoms of a compound of one atom of sesqui-base combined with three-quarters of an atom of silicic acid, plus 12 atoms of water. In Chlorite and Pennine the proto-bases are Magnesia and Iron, but in Clinochlore Magnesia only; in Chlorite and Clinochlore the sesqui-base is Alumina only, while in Pennine it is Alumina and Iron. It will thus be seen that a large figure written as a co-efficient refers to the whole of the member to which it is prefixed, while a small figure written as an exponent refers only to the symbol to which it is attached. Thus $5R^3\text{Si}_2^3$ means five atoms of $R^3\text{Si}_2^3$, while R^3 means simply three atoms of R . When the symbols are written together the substances are in chemical combination—thus As_2S_3 which is the formula for Realgar, p. 2, characterizes that mineral as a sulphuret of Arsenic. When one element is combined with several these are placed in brackets and each symbol is followed by a comma—thus Smaltine $(\text{Co}, \text{Fe}, \text{Ni})\text{As}_2$, p. 4, is an Arseniuret of Cobalt, Iron, and Nickel. In this case the proportions of Cobalt, Iron, and Nickel are not stated. In the formula of Eisennickelkies $(\frac{1}{3}\text{Ni} + \frac{2}{3}\text{Fe})\text{S}$, p. 3, a sulphuret of Nickel and Iron, the proportions are stated. The general formula in this case would be RS ; one-third of R is Nickel, and the other two-thirds Iron. When more than one element is combined with several others, both members are written in brackets; thus Glaneodot $(\text{Co}, \text{Fe})(\text{S}, \text{As})_2$, p. 4, is a Bi-sulpho-arsenuret of Cobalt and Iron. In some instances, as Bismuth Silver, p. 1, no formula has been given, but simply an enumeration of the elements of which the mineral is composed; in this case each symbol is followed by a comma.

When the water of a mineral has not been determined, it has been written Aq. instead of H_2O .

SYSTEMS OF CRYSTALLIZATION.

No.	SIMPLE FORMS.	AXES.
1	Cube and octahedron.	3 axes rectangular and equal.
2	Right prism with square base.	3 axes rectangular, 2 equal.
3	Right prism with rectangular or rhombic base.	3 axes rectangular and unequal.
4	Right rhomboidal and oblique rhombic prisms.	3 axes unequal, 2 rectangular.
5	Oblique dissymetric rhomboidal prism.	3 axes unequal, and unequally inclined.
6	Rhombohedron and hexagonal prism.	4 axes, 3 equal and equally inclined, 1 at right angles to the other three.

NAMES USED BY DIFFERENT AUTHORS.

No.	Naumann.	Mohs.	Weiss & Rose.	Phillips.	Delafose.	Dana.
1	Tesseral.	Tessular.	Regular.	Cubic.	Cubic.	Monometric.
2	Tetragonal.	Pyramidal.	2 and 1 axial.	Pyramidal.	Tetragonal.	Dimetrio.
3	Rhombic.	Orthotype.	1 and 1 axial.	Prismatic.	Orthorhombic.	Trimetrio.
4	Monoclinohedric.	Hemiortho-type.	2 and 1 membered.	Oblique.	Clino-rhombic.	Monoclinic.
5	Triclinohedric.	Anorthotype.	1 and 1 membered.	Anorthic.	Clino-hedrio.	Triclinic.
6	Hexagonal.	Rhombohedral.	3 and 1 axial.	Rhombohedral.	Hexagonal.	Hexagonal.



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CATALOGUE OF MINERALS.

No.	Name.	Formula.	System of crystallization.
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A. NATIVE ELEMENTS.

1. *Hydrogen Group.*

1. Gold *	Au	1
2. Platinum *	Pt	1
3. Platiniridium *	Ir, Pt	1
4. Palladium	Pd	1
5. Quicksilver *	Hg	1
6. Amalgam	Ag Hg ² and Ag Hg ³	1
7. Arquerite	Ag ⁶ Hg	1
8. Gold Amalgam *	(Au, Ag) ² Hg ²	
9. Silver *	Ag	1
10. Bismuth Silver	Fe, Bi, Pb, Ag	1?
11. Copper *	Cu	1
12. Lead	Pb	1
13. Iron *	Fe	1
14. Tin	Sn	2
15. Zinc	Zn	6

2. *Arsenic Group.*

16. Iridosmine *	Ir, Os, Rd	6
17. Tellurium	Te	6

No.	Name.	Formula.	System of crystallization.
18.	Bismuth *	Bi	6
19.	Tetradymite *	Bi, Te	6
20.	Antimony	Sb	6
21.	Arsenic *	As	6
22.	Arsenical Antimony *	Sb, As	6
23.	Sulphur *	S	3
24.	Selenium	Se	4
25.	Selensulphur	Se, S	
		3. Carbon Group.	
26.	Diamond.*	C	1
27.	Mineral Coal	C	
27a.	Anthracite *		
27b.	Bituminous Coal *		
27c.	Jet *		
27d.	Lignite *		
28.	Graphite *	C	6

B. SULPHURETS, ARSENIURETS, ETC.

I. BINARY COMPOUNDS.

1. Compounds of Elements of the Arsenic Group with
one another.

29.	Realgar	As S	4
30.	Orpiment *	As ³ S ²	3
31.	Dimorphine	As ⁴ S ³	3
32.	Bismuthine *	Bi ² S ³	3
33.	Stibnite *	Sb ³ S ²	3

No.	Name.	Formula.	System of crystallization.
2. Compounds of Elements of the Arsenic Group with those of the Hydrogen Group.			
<i>1. Discrasite Division.</i>			
34. Discrasite	$\text{Ag}^2 \text{Sb}$		3
35. Domeykite *	$\text{Cu}^3 \text{As}^2$		
36. Algodonite *	$\text{Cu}^6 \text{As}^2$		
37. Whitneyite *	$\text{Cu}^9 \text{As}^2$		
<i>2. Galena Division.</i>			
38. Silver Glance *	Ag S		1
39. Erubescite *	$(\text{Fe}, \text{Cu}) \text{S}$		1
40. Galena *	Pb S		1
41. Steinmannite	Pb, S, Sb		1
42. Cuproplumbite ?	$2\text{Pb S} + \text{Cu S}$		1
43. Alisonite	$3\text{Cu S} + \text{Pb S}$		
44. Manganblende	Mn S		1
45. Syepoorite	Co S		
46. Eisennickelkies	$(\frac{1}{2}\text{Ni} + \frac{1}{2}\text{Fe}) \text{S}$		1
47. Clausthalite	Pb Se		1
48. Naumannite	Ag Se		1
49. Berzelianite	Eu Se		
50. Eucairite	$(\text{Eu}, \text{Ag}) \text{Se}$		
51. Hessite *	Ag Te		1†
52. Altaite	Pb Te		1
53. Grünauite	$(\text{Bi}, \text{Ni}, \text{Co}, \text{Fe})^2 \text{S}^3$		1
54. Blonde *	Zn S		1
55. Copper Glance *	Cu S		3

No.	Name.	Formula.	System of crystallization.
56.	Akanthite	Ag S	3
57.	Stromeyerite	(Cu, Ag) S	3
58.	Cinnabar *	Hg S	6
59.	Millerite *	Ni S	6
60.	Pyrhotine *	Fe ⁷ S ⁸	6
61.	Greenockite	Cd S	6
62.	Wurtzite	Zn S	6
63.	Onofrite	Hg ⁶ Se ⁵	
64.	Copper Nickel *	Ni As	6
65.	Breithauptite *	Ni Sb	6
66.	Kaneite	Mn As	
67.	Schreibersite	Fe, P, Ni	

3. *Pyrates Division.*

68.	Pyrates *	Fe S ²	1
69.	Hauerite	Mn S ²	1
70.	Smaltine *	(Co, Fe, Ni) As ²	1
71.	Cobaltine	Co (S, As) ²	1
72.	Gersdorffite *	Ni (S, As) ²	1
73.	Ullmannite	Ni (S, As, Sb) ²	1
74.	Marcasite *	Fe S ²	3
75.	Rammelsbergite	Ni As ²	3
76.	Leucopyrite *	Fe As ²	3
77.	Mispickel *	Fe (As, S) ²	3
78.	Glaucochroite	(Co, Fe) (S, As) ²	3
79.	Sylvanite *	(Ag, Au) Te ²	3.
80.	Nagyagite	(Pb, Au) (Te, S) ²	2

No.	Name.	Formula.	System of crystallization.
81.	Covellite	Cu S ²	6
82.	Molybdenite *	Mo S ²	6
83.	Riolite	Ag Se ²	6?
4. <i>Skutterudite Division.</i>			
84.	Skutterudite	Co As ³	1

II. DOUBLE BINARY COMPOUNDS.

1. The Persulphuret a Sulphuret of an Element of the Hydrogen Group, as of Iron, Cobalt, or Nickel.

85.	Linnæsite *	Co S + Co ² S ²	1
86.	Cuban	Cu S + Fe ² S ²	1
87.	Chalcopyrite *	Cu S + Fe ² S ³	2
88.	Barnhardite *	2Cu S + Fe ² S ²	2
89.	Tin Pyrites	Cu S (Sn ² S ² , Fe ² S ²)	2?
90.	Sternbergite	Ag S + 2Fe ² S ² ?	3

2. The Persulphuret a Sulphuret of Elements of the Arsenic Group.

91.	Wolfsbergite	Cu S + Sb ² S ²	3
92.	Tannenite	Cu S + Bi ² S ²	3?
93.	Berthierite	Fe S + Sb ² S ²	
94.	Zinkenite	Pb S + Sb ² S ²	3
95.	Miargyrite	Ag S + Sb ² S ²	4
96.	Plagionite	Pb S + $\frac{1}{2}$ Sb ² S ²	4
97.	Jamesonite	Pb S + $\frac{1}{2}$ Sb ² S ²	3
98.	Heteromorphite	Pb S + $\frac{1}{2}$ Sb ² S ²	
99.	Bronniardite	(Pb, Ag) S + $\frac{1}{2}$ Sb ² S ²	1
100.	Chiviatite	(Cu, Pb) S + $\frac{1}{2}$ Bi ² S ²	

No.	Name.	Formula.	System of crystallization.
101.	Dufrenoysite	Pb S + $\frac{1}{2}$ As ² S ³	1
102.	Pyrargyrite	Ag S + $\frac{1}{2}$ Sb ² S ³	6
103.	Proustite *	Ag S + $\frac{1}{2}$ As ² S ³	6
104.	Freieslebenite *	(Ag, Pb) S + $\frac{1}{2}$ Sb ² S ³	4
105.	Bournonite	(Cu, Pb) S + $\frac{1}{2}$ Sb ² S ³	3
106.	Kenngottite	Ag, Pb, S, Sb	4
107.	Boulangerite	Pb S + $\frac{1}{2}$ Sb ² S ³	
108.	Alkinite	(Cu, Pb) S + $\frac{1}{2}$ Bi ² S ³	3
109.	Wölkite	Pb, Cu, As, Sb, S	3
110.	Clayite ?	(Cu, Pb) (S, As, Sb)	1
111.	Kobellite ?	(Fe, Pb) S + $\frac{1}{2}$ (Sb, Bi) ² S ³	1?
112.	Meneghinito	Pb S + $\frac{1}{2}$ Sb S ³	
113.	Tetrahedrite *	(Cu, Fe, Zn, Ag) S + $\frac{1}{2}$ (Sb, As) ² S ³	1
114.	Tennantite *	(Cu, Fe) S + $\frac{1}{2}$ As ² S ³	1
115.	Geocromite *	Pb S + $\frac{1}{2}$ (Sb, As) ² S ³	3
116.	Polybasite	(Ag, Cu) S + $\frac{1}{2}$ (Sb, As) ² S ³	6
117.	Stephanite	Ag S + $\frac{1}{2}$ Sb ² S ³	3
118.	Enargite *	(Cu, Fe, Zn) S + $\frac{1}{2}$ (As, Sb) ² S ³ ?	3
119.	Xanthocone	(3Ag S + As ² S ³) + 2(3Ag S + As ² S ³)	6
120.	Fireblende	Ag, S, Sb	4
121.	Wittichite	Cu, Bi, S	3

C. FLUORIDS, CHLORIDS, BROMIDS, IODIDS.

1. *Calomel Division.*

122.	Calomel	Hg ² Cl	2
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No.	Name.	Formula.	System of crystallization.
2. <i>Rock Salt Division.</i>			
123.	Sylvine	K Cl	1
124.	Salt *	Na Cl	1
125.	Sal Ammoniac	NH ⁴ Cl	1
126.	Kerargyrite *	Ag Cl	1
127.	Embolite	3Ag Cl + 2Ag Br	1
128.	Bromyrite	Ag Br	1
129.	Iodo-bromid of Silver	Ag, I, Br	
130.	Fluor *	Ca F	1
131.	Ytrococrite *	Ca F, YF, Ce F	
132.	Iodyrite	Ag I	6
133.	Coccinite	Hg I	2?
134.	Fluocerite	Eu, Y, HF	6
135.	Fluocerine	Ce ² F ³ + 3 Eu II	1?
136.	Cotunnite	Pb Cl	3
137.	Muriatic Acid	H Cl	
138.	Cryolite	Na F + $\frac{1}{2}$ Al ² F ³	2
139.	Chiolite	Na F + $\frac{2}{3}$ Al ² F ³	2
140.	Fluellite	Al, F	3
141.	Carnallite	K Cl + Mg Cl + 12 H ₂ O	
142.	Tachhydrite	Ca Cl + 2Mg Cl + 12 H ₂ O	

No.	Name.	Formula.	System of crystallization.
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D. OXYGEN COMPOUNDS.

I. BINARY COMPOUNDS.

1. Oxides of the Elements of the Hydrogen Group.

A. ANHYDROUS OXIDES.

1. Monometric.

143. Periclase	Mg	1
144. Red Copper *	Cu	1
145. Martite *	Fe	1
146. Ilmenite	Fe (Fe, Ti)	1
147. Irite ?	(Ir, Os, Fe) (Ir, Os, Cr) ² O ³ ?	1
148. Spinel *	* Mg Al	
149. Magnetite *	Fe Fe	1
150. Magnoferrite	† Mg ³ Fe ⁴	1
151. Franklinite *	(Fe, Zn) ³ (Fe, Mn)	1
152. Chromic Iron *	(Fe, Mg) (Al, Cr)	1
153. Pitchblende	U O?	1
154. Melaconite *	Cu	1?
155. Plumbic Ochre *	Pb	

2. Hexagonal.

156. Water *	H	6
157. Zincite *	Zn	6
158. Corundum *	Al	6
159. Hematite *	Fe	6
160. Ilmenite *	Ti, Fe,	6
161. Plattnerite	Pb	6?
162. Tenorite	Cu	6?

* Mg may be replaced by Ca, Fe, Mn, or Zn, alone or in combination.

† Rammelsberg gives the formula Mg^m Feⁿ, and gives 3 and 4 as the probable values of m and n.

No.	Name.	Formula.	System of crystallization.
3. <i>Dimetric.</i>			
163.	Braunite *	Mn Mn	2
164.	Hausmannite *	Mn Mn	2
165.	Cassiterite *	Sn	2
166.	Rutile *	Ti	2
167.	Anatase *	Ti	2
4. <i>Trimetric.</i>			
168.	Chalcotrichite *	En	3
169.	Chrysoberyl *	Be + Al ²	3
170.	Brookite *	Ti	3
171.	Pyrolusite *	Mn	3
172.	Polianite	Mn Mn	3
<i>Appendix to Anhydrous Oxides.</i>			
173.	Minium *	Pb ² Pb	
174.	Crednerite	Cu ² Mn ²	4
175.	Heteroclin ?	Mn, Si	4
176.	Palladinite ? *	Pa	
5. <i>Combinations of Oxides and Chlorides or Sulphurets.</i>			
177.	Volzsite	4Zn S + Zn	
178.	Matlockite	Pb Cl + Pb	2
179.	Mendipite	Pb Cl + 2Pb	3
180.	Percylite ?	(Pb Cl + Pb) + (Cu Cl + Cu) + Aq	1
181.	Karelinite ?	Bi + Bi S	
B. HYDROUS OXIDES.			
182.	Diaspore *	Al II	3
183.	Göthite *	Fe II	3

No.	Name.	Formula.	System of crystallization.
184.	Manganite	Mn II	3
185.	Limonite *	Fe ² II ³	
186.	Brucite *	Mg II	6
187.	Gibbsite *	Al II ³	6

Appendix to Hydrous Oxides.

188.	Völknerite *	Mg ² Al + 16H	6
189.	Hydrotalcite	Mg ² Al + 12H	
190.	Psilomelane *	(Mn, Ba) Mn ² + II	
191.	Newkirkite	Mn, Fe, II	
192.	Wad *	* R Mn + II	
193.	Atacamite	Cu Cl + 3Cu II	3

2. Oxides of Elements of the Arsenic Group.

1. Arsenic Division.

194.	Arsenolite *	As	1
195.	Senarmontite	Sb	1
196.	Valentinite	Sb	3
197.	Bismuth Ochre *	Bi	
198.	Kermesite	2Sb S + Sb	4
199.	Retzbanite	(3Bi S + 2Cu S, Pb S) + 2Pb S	
200.	Cervantite	Sb + Sb	
201.	Volgerite	Sb + 5II	
202.	Ammiolite	Hg, Sb, Fe, II	

2. Sulphur Division.

203.	Sulphurous Acid *	S
204.	Telluric Ochre	Te?

* R = K, Ba, Co, Mn.

No.	Name.	Formula.	System of crystallization.
205.	Sulphuric Acid *	S H_2	
206.	Wolframine *	W	1
207.	Molybdine *	Mo	3
3. Oxygen Compounds of Carbon, Boron and Silicon.			
208.	Carbonic Acid *	O_2	
209.	Bassolin	B II^3	5
210.	Quartz *	Si	6
	210 ^a . Jasper *		
	210 ^b . Agate *		
	210 ^c . Chalcedony *		
211.	Opal *	Si	
	211 ^a . Precious opal		
	211 ^b . Semi-opal *		
	211 ^c . Hyalite *		
	211 ^d . Geyserite		

II. OXYGEN DOUBLE BINARY COMPOUNDS.

1. Silicates.

A. ANHYDROUS SILICATES.

1. *Edelforsite Section.*

212.	Edelforsite	Ca Si	
2. <i>Augite Section.</i>			
213.	Wollastonite *	$\text{Ca}^3 \text{Si}^2$	4
214.	Pyroxene	$\text{Fe}^2 \text{Si}^2$	4
	214 ^a . Diopside *	$(\text{Ca, Mg})^3 \text{Si}^2$	
	214 ^b . Hedenbergite *	$(\text{Ca, Fe})^3 \text{Si}^2$	
	214 ^c . Augite *	$(\text{Ca, Mg, Fe})^3 \text{Si}^2$	
215.	Pelicanite	$\text{Al Si}^2 + 2\text{H}_2\text{O}$	

No.	Name.	Formula.	System of crystallization.
216.	Spodumene *	$(\text{Li}, \text{Na})^3\text{Si}^2 + 4\text{AlSi}^2$	4
217.	Prehnitoid	$(\text{Na}, \text{Ca})^3\text{Si}^2 + 2\text{AlSi}^2$	
218.	Amphibole	R^4Si^2	4
218 ^a .	Tremolite *	$(\text{Ca} + 3\text{Mg})\text{Si}^2$	
218 ^b .	Actinolite *	$(\text{Ca} + 3(\text{Mg}, \text{Fe}))\text{Si}^2$	
218 ^c .	Hornblende *	$(\text{Fe} + 3\text{Mg})\text{Si}^2$	
219.	Actomite	$\text{NaSi} + \text{FeSi}^2$	4
220.	Strakonitzite?	$\text{Ca}, \text{Mg}, \text{Fe}, \text{Al}, \text{Si}, \text{H}$	4
221.	Enstatite	Mg^3Si^2	3
222.	Anthophyllite *	$(\text{Fe} + 3\text{Mg})\text{Si}^2$	3
223.	Hypersthene *	$(\text{Fe}, \text{Mn})^3\text{Si}^2$	3
224.	Wichtyne	$(\text{Na}, \text{Ca}, \text{Mg}, \text{Fe})^3\text{Si} + \text{AlSi}^2$	
225.	Babingtonite *	$(\text{Ca}, \text{Fe})^3\text{Si}^2$	5
226.	Rhodonite *	Mn^3Si^2	5
227.	Beryl *	$(\frac{1}{2}\text{Be} + \frac{1}{2}\text{Al})\text{Si}^2$	6
228.	Eudialyte	$2(\text{Ca}, \text{Na}, \text{Fe})^3\text{Si}^2 + \text{ZrSi}^2$	6

3. *Eulytine Section.*

229.	Eulytine	Bi^2Si^2	1
230.	Leucophane	$\text{Ca}^3\text{Si}^2 + \text{BeSi} + \text{NaF}$	3
231.	Melinophane	$* \text{R}^3\text{Si}^2 + \text{RSi} + \text{NaF}$	6?

4. *Garnet Section.*

232.	Peridot	R^3Si	3
232 ^a .	Forsterite *	Mg^3Si	
232 ^b .	Chrysolite *	$(\text{Mg}, \text{Fe})^3\text{Si}$	
232 ^c .	Fayalite *	Fe^3Si	

* R = Ca, Na. R = Al, Be

No.	Name.	Formula.	System of crystallization.
233.	Tephroite *	Mn ³ Si	2?
234.	Knebelite	(Fe, Mn) ³ Si	
235.	Chondrodite *	* Mg ⁴ Si	3
236.	Willemite *	Zn ² Si	6
237.	Phenacite *	BeSi	6
238.	Garnet	R ³ Si + R Si	1
238a.	Pyrope *	(Ca, Mg) ² Si + (Al, Fe) Si	
238b.	Grossular *	Ca ³ Si + Al Si	
238c.	Almandine *	Fe ³ Si + Al Si	
239a.	Spessartine *	Mn ³ Si + Al Si	
239b.	Melanite *	Ca ³ Si + Fe Si	
239c.	Ouvarovite	Ca ³ Si + (Cr Al) Si	
239.	Heilvin	(Mn, Fe) ² Si ² + Be Si + Mn S	1
240.	Zircon *	Zr Si	2
241.	Auerbachite	Zr ₂ Si ₂	2
242.	Alvite ?	Th, Y, Zr, Fe, Al, Be, Si, H	2
243.	Tachyaphaltite	Th, Al, Fe, Zr, Si, H	2
244.	Idocrase *	(Ca, Mg, Fe) ² Si + Al Si	2
245.	Barroolite	(Ca, Na) ² Si + Al Si	2
246.	Melonite	Ca ³ Si ² + 2Al Si	2
247.	Scapolite *	Ca ³ Si ² + 2Al Si	2
248.	Medillite	2(Ca, Na, Mg) ² Si + (Al, Fe) Si	2
249.	Dipyre	4(Ca, Na) Si + 3Al Si	2

* Part of the oxygen is replaced by fluorine in varying proportions.

No.	Name.	Formula.	System of crystallization.
250.	Epidote	$R^3 Si + 2R Si$	5
250a.	Pistacite *	$(Ca, Fe)^3 Si + 2Al Si$	
250b.	Zoisite *	$Ca^3 Si + 2Al Si$	
250c.	Piedmontite	$Ca^3 Si + 2(Al, Mn) Si$	
251.	Allanite *	$* R^3 Si + R Si$	4
252.	Partschin	$(Fe, Mn)^3 Si + Al Si$	4
253.	Zoisite Brooke	$Ca^3 Si + 2Al Si$	4
254.	Gadolinite	$\dagger (R^3, R) Si$	4
255.	Danburite †	$Ca^3 Si + 3B Si$	5
256.	Axinite *	$\dagger (R^3, R, B) Si$	5
257.	Iolite *	$(Mg, Fe)^3 Si^2 + 3Al Si$	3
5. <i>Mica Section.</i>			
258.	Muscovite *	$\S (1/2 K^3 + 1/2 R) Si \ddagger$	3
259.	Phlogopite *	$3(K, Mg)^3 Si + 2Al Si$	3
260.	Biotite *	$(K, Mg)^3 Si + (Al, Fe) Si$	3?
261.	Astrophyllite	$K, Na, Ca, Fe, Mn, Ti, Al, Zr, Fe, Si$	
262.	Lepidomelane	$(K, Fe)^3 Si + 3(Al, Fe) Si$	3?
263.	Lepidolite *	$(K, Li) Si + (Al, Fe) Si$	3
6. <i>Feldspar Section.</i>			
264.	Sodalite *	$Na^3 Si + 3Al Si + Na Cl$	1
265.	Lapis Lazuli	Na, Ca, Al, Fe, Si, S	1
266.	Häuynite	$Na^3 Si + 3Al Si + 2Ca S$	1
267.	Nosean	$Na^3 Si + 3Al Si + Na S$	1
268.	Skolopsite	$\dagger R^3 Si^2 + Al Si + \S Na S$	
* $R = Ca, Ce, La, Di, Fe, Mg.$ $R = Al, Fe$		$\dagger R = Ca, Ce, Fe, Y.$ $R = Be.$	
† $R = Ca.$ $R = Al, Fe, Mn.$		$\S R = Al, Fe.$	
$R = Na, Ca, Mg, Mn.$			

No.	Name.	Formula.	System of crystallization.
269.	Leucite	$K^3Si^2 + 3AlSi^2$	1
270.	Nepheline *	$(Na, K)^2Si + 2AlSi$	6
271.	Canorlnite *	$Na^2Si + 2AlSi + (Na, Ca)O + H_2O$	
272.	Anorthite	$(Na, K, Ca, Mg)^2Si + 3AlSi$	5
273.	Andesine *	$(Ca, Na)^2Si^2 + 3AlSi^2$	5
274.	Barsowite	$Ca^2Si^2 + 3AlSi$	5?
275.	Bytownite ?	$Ca^2Si^2 + 3AlSi$	
276.	Labradorite *	$(Ca, Na)Si + AlSi$	5
277.	Oligoclase *	$(Ca, Na)Si + AlSi^2$	5
278.	Albite *	$NaSi + AlSi^2$	5
279.	Orthoclase *	$KSi + AlSi^2$	4
280.	Petalite *	$(Li, Na)^2Si^4 + 4AlSi^4$	5?

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281.	Cyclopite	$(Ca, Na)^2Si + 2(Al, Fe)Si$	5
282.	Weissigite ?	Na, K, Li, Al, Si	4
283.	Pollux	K, Na, Al, Fe, Si	
284.	Isopyre	$CaSi + (Al, Fe)Si$	
285.	Silicate of Yttria ?	Y, Si	
286.	Polyohroilite	Mg, Al, Fe, Si, H	6?

7. *Andalusite Section.*

287.	Gehlenite	$3(Mg, Ca)^2Si + (Fe, Al)^2Si$	2
288.	Andalusite *	* $AlSi_2$	3
289.	Topaz *	* $AlSi_2$	3
290.	Staurolite *	† $(Al, Fe)Si_2$	3
291.	Carolathine	$AlSi_2$	

* And $AlSi_2$. In Topaz part of the oxygen is replaced by fluorine.

† And $AlSi_2$. Rammelsberg writes the formula $(R, H)^2 + Si^2$.

No.	Name.	Formula.	System of crystallization.
292.	Lievrite *	$3(\text{Fe}, \text{Ca})^2 \text{Si} + \text{Fe}^2 \text{Si}$	3
293.	Kyanite *	$\text{Al} \text{Si}_3$	5
294.	Sillimanite *	$* \text{Al} \text{Si}_3$	3
295.	Sapphirine	$\text{Mg}, \text{Fe}, \text{Al}, \text{Si}$	3?
296.	Euclase	$(\frac{1}{2} \text{Be} + \frac{1}{2} \text{Al}) \text{Si}_3$	4
297.	Sphene *	$(\text{Ca}, \text{Ti}) \text{Si}_3$	4
298.	Keilhauite	$(\text{Y}, (\text{Ca}, \text{Ti}), \text{Al}, \text{Fe}, \text{Mn}, \text{Cr}) \text{Si}_3$	4
299.	Tourmaline *	$\dagger (\text{R}^3, \text{R}, \text{B}) \text{Si}_3$	6

B. HYDROUS SILICATES.

I. Magnesian Hydrous Silicates.

1. *Talc Section.*

300.	Talc *	$\text{Mg}^2 \text{Si}^4 + 2\text{H}_2\text{O}$	3?
301.	Meerschaum *	$\text{Mg} \text{Si} + \text{H}_2\text{O}$?	
302.	Neolite	$(\text{Fe}, \text{Mg}) \text{Si} + \frac{1}{2}\text{H}_2\text{O}$?	
303.	Spadaite	$\text{Mg}^2 \text{Si}^4 + 4\text{H}_2\text{O}$	
304.	Chlorophæsite	$\text{Fe} \text{Si} + 6\text{H}_2\text{O}$?	
305.	Crocidolite	$(\text{Na}, \text{Mg}, \text{Fe})^2 \text{Si}^5 + 2\text{H}_2\text{O}$	4?

2. *Serpentine Section.*

306.	Picrophyll	$(\text{Mg}, \text{Fe})^3 \text{Si}^2 + 2\text{H}_2\text{O}$	6?
307.	Kerolite *	$\text{Mg}^2 \text{Si}^2 + 4\frac{1}{2}\text{H}_2\text{O}$	
308.	Monradite	$(\text{Mg}, \text{Fe})^3 \text{Si}^2 + \frac{1}{2}\text{H}_2\text{O}$	
309.	Aphrodite	$\text{Mg}^2 \text{Si}^2 + 2\frac{1}{2}\text{H}_2\text{O}$	
310.	Picrosmine	$\text{Mg}^2 \text{Si}^2 + 1\frac{1}{2}\text{H}_2\text{O}$	3
311.	Saponite *	$2\text{Mg}^2 \text{Si}^2 + \text{Al} \text{Si} + 10\text{H}_2\text{O}$	

* And $\text{Al} \text{Si}_3$.† $\text{R} = \text{Fe}, \text{Mg}, \text{Ca}, \text{Na}$. $\text{B} = \text{Al}, \text{Fe}$.

No.	Name.	Formula.	System of crystallization.
312.	Serpentine *	Mg ² Si ⁴ + 2H	3?
313.	Deweylite *	Mg ² Si + 3H	
314.	Hydrophite *	(Mg, Fe) ² Si + 3H?	
315.	Nickel Gymnrite *	(Ni, Mg) ² Si + 3H	

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316.	Ottrelite *	(Fe, Mn) ³ Si ² + 2Al Si + 3H	4?
317.	Groppite	(K, Ca, Mg) ² Si ² + 2Al Si + 3H	
318.	Stilpnomelane	Fe ³ Si ² + Al Si ² + 7H	
319.	Chalcodite †	2(Fe, Mg)Si + (Al, Fe)Si + 3H	
320.	Eukamptite	(Mg, Fe) ³ Si + Al Si + H	
321.	Melanhydrite	(Mg, Fe, Mn) ² Si ² + 2(Al, Fe)Si + 12H	

3. *Chlorite Section.*

322.	Hisingerite	Fe ³ Si + 2Fe Si + 6H	
323.	Thuringite *	2Fe ³ Si + (Al, Fe) ³ Si + 6H	
324.	Euphyllite †	(Na, K, Ca) ² Si + 8Al Si + 6H	
325.	Pyrosclerite *	2Mg ³ Si + Al Si + 6H	6?
326.	Pseudophite ?	4(Mg, Fe) ³ Si + Al ² Si + 9H	
327.	Thermophyllite ?	Mg ³ Si ² + (Al, Fe)Si ² + 2H	
328.	Chlorite	5Fe ³ Si ² + 3R Si ² + 12H	6
328a.	Chlorite *	5(Mg, Fe) ³ Si ² + 3Al Si ² + 12H	
328b.	Pennine	5(Mg, Fe) ³ Si ² + 3(Al, Fe)Si ² + 12H	
328c.	Clinochlore *	5Mg Si ² + 3Al Si ² + 12H	
329.	Delessite	(Mg, Fe) ³ Si ² + (Al, Fe)Si ² + 3H	6?
330.	Ripidolite G. Rose	(Mg, Fe) ³ Si ² + Al Si ² + 3H	6
331.	Clintonite *	Ca, Mg, Fe, Al, Si, H	
332.	Chloritoid *	(Fe, Mg) ³ Si ² + 2Al Si ² + 3H	

No.	Name.	Formula.	System of crystallization.
333.	Cronstedtite	$(\text{Mg}, \text{Fe}, \text{Mn})^3 \text{Si}_\frac{1}{2} + \text{Fe Si}_\frac{1}{2} + 3\text{H}$	6
334.	Sideroschisolite	$\text{Fe}^3 \text{Si}_\frac{1}{2} + \frac{1}{2}\text{H}$	6
335.	Margarite *	$(\text{Na}, \text{Ca})^3 \text{Si} + 3\text{Al}^3 \text{Si} + 3\text{H}$	3
336.	Ephesite	$\text{Na}, \text{K}, \text{Ca}, \text{Al}, \text{Si}, \text{H}$	

II. Non-Magnesian Hydrous Silicates.

1. *Pyrophyllite Section.*

337.	Pyrophyllite *	$\text{Al Si}^3 + 1\frac{1}{2}\text{H}$	3
338.	Pholerite *	$\text{Al}^3 \text{Si}^4 + 6\text{H}$	
339.	Anthosiderite	$\text{Fe Si}^3 + \text{H}$	

2. *Pectolite Section.*

340.	Apophyllite *	$(\text{Ca}, \text{K})^3 \text{Si}^3 + 2\text{H}$	2
341.	Pectolite *	$(\text{Ca}, \text{Na})^4 \text{Si}^3 + \text{H}$	4
342.	Okenite	$\text{Ca}^3 \text{Si}^4 + 6\text{H}$	3?
343.	Laumontite *	$\text{Ca}^3 \text{Si}^3 + 3\text{Al Si}^3 + 12\text{H}$	4
344.	Leonhardite *	$\text{Ca}^3 \text{Si}^3 + 3\text{Al Si}^3 + 9\text{H}$	4
345.	Catapleelite	$(\text{Na}, \text{Ca})^3 \text{Si}^3 + 2\text{Zr Si}^3 + 6\text{H}$	6
346.	Dioprase	$\text{Cu}^3 \text{Si}^3 + 3\text{H}$	6
347.	Chrysocolla *	$\text{Cu}^3 \text{Si}^3 + 6\text{H}$	
348.	Demidoffite	$\text{Cu}, \text{Si}, \text{H}$	
349.	Pyrosmalite	$* 4(\text{Fe}^3 \text{Si} + 2\text{Fe}^3 \text{Si}^3 + 6\text{H}) + 3\text{Fe Cl}$	6
350.	Portite	$\text{Al Si}^3 + 2\text{H}$	3

3. *Calamine Section.*

351.	Tritomite	$\dagger \text{H Si} + 2\text{H} \dagger$	1
352.	Thorite	$\text{Th}^3 \text{Si} + 3\text{H}$	2
353.	Cerite	$(\text{Ce}, \text{La}, \text{Di})^3 \text{Si} + \text{H}$	6

* $\text{R} = \text{Fe}, \text{Mn}.$

† $\text{H} = \text{Ce}, \text{La}.$

No.	Name.	Formula.	System of crystallization.
354.	Calamine *	$Zn^2Si + 1\frac{1}{2}H$	3
355.	Prehnite *	$Ca^2Si + AlSi + H$	3
356.	Chlorastrolite †	$(Ca, Na)^2Si + 2(Al, Fe)Si + 3H$	
357.	Savite	$(Na, Mg)^2Si^2 + AlSi + 2H$	3
358.	Schneiderite	$3(Ca, Mg)^2Si^2 + Al^2Si^2 + 3H$	
359.	Carpholite	$(Al, Fe, Mn)Si + 1\frac{1}{2}H$	3
4. Zeolite Section.			
360.	Analcime *	$Na^2Si^2 + 3AlSi + 6H$	1
361.	Ittnerite	$(Na, Ca)^2Si + 3AlSi + 6H$	1
362.	Faujasite	$(Na, Ca)Si + AlSi^2 + 9H$	1
363.	Chabazite *	$(Ca, Na, K)^2Si^2 + 3AlSi^2 + 18H$	6
364.	Gmelinite	$(Ca, Na, K)^2Si^2 + 3AlSi^2 + 18H$	6
365.	Levyne	$CaSi + AlSi + 4H$	6
366.	Gismondine	$(Ca, K)^2Si + 2AlSi + 9H$	2
367.	Edingtonite	$3BaSi + 4AlSi + 12H$	2
368.	Harmotome	$BaSi + AlSi^2 + 5H$	3
369.	Phillipsite	$(Ca, K)Si + AlSi^2 + 5H$	3
370.	Thomsonite *	$(Ca, Na)^2Si + 3AlSi + 7H$	3
371.	Natrolite *	$NaSi + AlSi + 2H$	3
372.	Scolecite	$CaSi + AlSi + 3H$	4
373.	Ellagite	$Ca^2Si^4 + AlSi + 12H$	4?
374.	Sloanite	$(Ca, Mg)^2Si^2 + 5AlSi + 9H$	3
375.	Epistilbite	$(Ca, Na)Si + AlSi^2 + 5H$	3
376.	Heulandite *	$CaSi + AlSi^2 + 5H$	4
377.	Brewsterite	$(Sr, Ba)Si + AlSi^2 + 5H$	4
378.	Stillbite *	$CaSi + AlSi^2 + 6H$	3
379.	Caporcielite	$Ca^2Si^2 + 3AlSi^2 + 9H$	4

No.	Name.	Formula.	System of crystallization.
5. <i>Datholite Section.</i>			
380.	Datholite *	$2\text{Ca}^2\text{Si} + \text{B}^3\text{Si}^2 + 3\text{H}$	4
381.	Allophane *	$\text{Al}^3\text{Si}^2 + 15\text{H}$	
382.	Schrötterite *	$\text{Al}^4\text{Si} + 3\text{H}$	

Appendix to Hydrous Silicates.

383.	Chloropal	$\text{FeSi}^2 + 3\text{H}$
384.	Collyrite	$\text{Al}^3\text{Si} + 15\text{H}$
385.	Wolchonskoite	$* \text{R Si} + 2\text{H}?$
386.	Chrome Ochre	$(\text{Al}, \text{Cr})^3\text{Si}^4 + 4\text{H}$
387.	Pimelite	$(\text{Ni}, \text{Mg})^2\text{Si} + 2(\text{Al}, \text{Fe})\text{Si} + 9\text{H}$
388.	Montmorillonite	$\text{Ca}, \text{K}, \text{Al}, \text{Fe}, \text{Si}, \text{H}$
389.	Delanovite?	$\text{Mn}^3\text{Si}^2 + 2\text{Al Si}^2 + 45\text{H}$
390.	Erdmanite	$\text{Ca}, \text{Fe}, \text{Mn}, \text{Y}, \text{Ce}, \text{La}, \text{Al}, \text{Si}, \text{H}$
391.	Bavalite	$\text{Ca}, \text{Mg}, \text{Al}, \text{Fe}, \text{Si}, \text{H}$

C. UNARRANGED SILICATES CONTAINING TITANIC ACID.

392.	Tscheffkinite	$((\text{Ca}, \text{Ti}), \text{Fe}, \text{La}, \text{Al})\text{Si}^2$
393.	Schorlomite †	$\dagger 2\text{R}^3\text{Si}^2 + 3\text{R Si}^2$
394.	Mosandrite	$\dagger \text{R}^3\text{Si} + 2\text{R Si} + 4\text{H}$
395.	Wölherite	$6(\text{Na}, \text{Ca})^2\text{Si} + 3\text{Zr Si} + \text{Ob Si}$

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396.	Turnerite?	$\text{Ca}, \text{Mg}, \text{Al}, \text{Si}?$	4
	* $\text{R} = \text{Er}, \text{Al}, \text{Fe}$.	$\dagger \text{R} = \text{Ca}$. $\text{R} = (\text{Ca}, \text{Ti}), \text{Fe}$.	
	† $\text{R} = \text{Ca}$. $\text{R} = (\text{Ca}, \text{Ti}), \text{Fe}, \text{D}, \text{La}$.		

No.	Name.	Formula.	System of crystallization.
2. Titanates, Tungstates, Molybdates, Tantalates, Columbates, Chromates, Vanadates.			
397. Peroftskite	Ca Ti	1	
398. Pyrochlore *	$4(\text{Ca, Mg, Ce, La, Y, U})(\text{Ti, Nb})$	1	
399. Pyrrhite	Ca, Zr, Nb	1	
400. Scheelite *	Ca W	2	
401. Scheelite	Pb W	2	
402. Tungstate of Copper ? †	Cu, Ca, W		
403. Wulfenite *	Pb Mo	2	
404. Azorite	Ca, Nb	2	
405. Fergusónite	$(Y, Ce)^x \text{Nb}$	2	
406. Tyrite ?	$\text{Y, Ce, Fe, U, Al, Nb}$	2	
407. Adelpholite	Fe, Mn Ta	2	
408. Tantalite	$(\text{Fe, Mn}) \text{Ta}$	3	
409. Wolfram *	$2\text{FeW} + 3\text{MnW}$ and $4\text{FeW} + \text{MnW}$	3	
410. Columbite *	$(\text{Fe, Mn}) \text{Nb}$	3	
411. Paracolumbite ? †	$\text{Fe, U, and a metallic acid.}$		
412. Samarskite *	$\text{Y, Ce, La, Fe, U, Nb}$	3	
413. Mengite	Fe, Zr, Ti	3	
414. Polymignyite *	$\text{Y, Ti, Zr, Fe, Ce, U, Ti, Zr, Fe, Ce, Nb}$	3	
415. Polycrase	$\text{U, Ti, Zr, Fe, Ce, Nb}$	3	
416. Eschynite	$2(\text{Ce, La, Y, Fe}) \text{Nb} + \text{Fe, Ti}$	3	
417. Euxenite	$\text{Ca, Mg, Y, Ce, La, U, Ti, Nb}$	3?	
418. Yttrio-Tantalite	$* \text{R}^3 (\text{Ta, W, G})$	3	
419. Parathorite †	Fe, Ti^3	3	
420. Rutherfordite †	Ce, Y, Ca, Ti	4	

* In the yellow $\text{R} = \text{Y}$. In the black $\text{R} = \text{Y, Ce, Fe}$. In the brown $\text{R} = \text{Y, Ce}$.

No.	Name.	Formula.	System of crystallization.
421.	Crococite	Pb Cr	4
422.	Vauquelinite *	(Cu, Pb) ² Cr ³	4
423.	Melanochroite	Pb ² Cr ³	3†
424.	Dechenite	2(Pb, Zn) ² V + (Pb, Zn) ² As	
425.	Descloizite	Pb ² V	3
426.	Vanadinite	Pb ² V + $\frac{1}{2}$ Pb Cl	6
427.	Volborthite	(Cu, Ca) ² V + H	6
428.	Pateraite ?	Cu, Co, V	

3. Sulphates and Selenates.

1. ANHYDROUS SULPHATES.

1. Trimetric.

429.	Glaserite	K S	3
430.	Thenardite	Na S	3
431.	Barytes *	Ba S	3
432.	Celestine *	Sr S	3
433.	Anhydrite *	Ca S	3
434.	Anglesite *	Pb S	3
435.	Almagrerie	Zn S	3
436.	Leadhillite *	Pb S + 3Pb O	3
437.	Caledonite *	Pb S, Pb Cr, Cu O	3

2. Rhombohedral.

438.	Dreelite	Ca S + 3Ba S	6
439.	Susannite	Pb S + 3Pb O	6 *

3. Monoclinic.

440.	Glauberite	($\frac{1}{2}$ Na + $\frac{1}{2}$ Ca) S	4
441.	Lanarkite	Pb S + Pb O	4

No.	Name.	Formula.	System of crystallization.
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Appendix to Anhydrous Sulphates.

442.	Reussin	$\text{Na}_2\text{S}, \text{Mg S}, \text{Ca Cl}$	
443.	Selenate of Lead	Pb Se	1?
444.	Connellite	$\text{Cu S}, \text{Cu Cl?}$	6
445.	Ajumian	Al S?	6?

2. HYDROUS SULPHATES.

446.	Misenite	$\text{K S} + \text{H S}$	
447.	Polyhalite	$(\text{K}, \text{Ca}, \text{Mg}) \text{S} + \frac{1}{2}\text{H}$	3
448.	Gypsum *	$\text{Ca S} + 2\text{H}$	4
449.	Astrakanite	$\text{Na S} + \text{Mg S} + 4\text{H}$	
450.	Löweite	$\text{Na S} + \text{Mg S} + 2\frac{1}{2}\text{H}$	
451.	Mascagnine	$\text{NH}^+ \text{S} + \text{H}$	3
452.	Leoontite	$(\text{Na}, \text{NH}^+) \text{S} + 2\text{H}$	3
453.	Coquimbite	$\text{Fe S}^3 + 9\text{H}$	6
454.	Römerite	$(\text{Fe}, \text{Zn}) \text{S} + \text{Fe S}^3 + 12\text{H}$	4
455.	Cyanosite *	$\text{Cu S} + 5\text{H}$	
456.	Cyanochrome	$(\frac{1}{2}\text{K} + \frac{1}{2}\text{Cu}) \text{S} + 3\text{H}$	4
457.	Picromerid	$(\text{Mg}, \text{Cu}) \text{S} + 3\text{H}$	4
458.	Alunogen *	$\text{Al S}^3 + 18\text{H}$	
459.	Alum	$\text{R S} + \text{Al S}^3 + 24\text{H}$	1
459a.	Potash Alum *	$\text{K S} + \text{H S} + \text{H}$	
459b.	Solfatarite	$\text{Na S} + \text{H S} + \text{H}$	
459c.	Tachermigite	$\text{NH}^+ \text{S} + \text{H}$	
459d.	Pickeringite	$\text{Mg S} + \text{H}$	
459e.	Halotrichite *	$\text{Fe S} + \text{H}$	
459f.	Apjohnite *	$\text{Mn S} + \text{H}$	

No.	Name.	Formula.	System of crystallization.
460.	Voltaite	Fe S + Fe S ² + 24H	1
461.	Epsomite *	Mg S + 7H	3
462.	Tauriscite ?	Fe S + 7H	3
463.	Mangan Vitriol ?	Mn, S, H	
464.	Goslarite	Zn S + 7H	
465.	Copperas *	Fe S + 7H	4
466.	Bieberite	(Co, Mg) S + 7H	4
467.	Pyromeline *	Ni, S, H	6?
468.	Morenosite	Ni, S, H	
469.	Johannite	2(U, G) S + (Cu, S) + 4H	4
470.	Basic Sulphate of Uranium	2(U, G) ² S ² + (Ca, Cu) S + 10H	
471.	Glauber Salt *	Na S + 10H	4
472.	Botryogen	Fe ² S ² + 3Fe S ² + 36H	4
473.	Copiapite	Fe ² S ² + 18H	
474.	Apatelite	2Fe ³ S ² + 3H	
475.	Alunite *	K S + 3Al ₂ S + 6H	6
476.	Jarosite	K S + 4Fe S + 9H	6
477.	Websterite	Al S + 9H	
478.	Loewigite	K S + 3Al ₂ S + 9H	
479.	Pissophane	(Fe, Al) ² S ² + 30H	
480.	Linarite	Pb S + Cu H	4
481.	Brochantite *	Cu ² S + 3H	3
482.	Lettsomite	(Cu ² S + 3H) + (Al ₂ S + 9H)	
483.	Medjidite	G S + Ca S + 15H	
484.	Uranochre	3U ² S + 14H and 2U ² S + Ca S + 28H	
485.	Uranochalcite	U G + 2Ca S + Cu S + 18H	

No.	Name.	Formula.	System of crystallization.
4. Borates.			
486.	Boracite	$2(\text{Mg}^2\text{B}^4) + \text{Mg Cl}$	1
487.	Rhodizite	$\text{Ca}^3\text{B}^4?$	1
488.	Hydroboracite	$\text{Ca}^3\text{B}^4 + \text{Mg}^2\text{B}^4 + 18\text{H}$	
489.	Hayesine	$\text{Ca B}^4 + 10\text{H}$	
490.	Boronatrocacite	$\text{Na B}^4 + \text{Ca}^3\text{B}^4 + 12\text{H}$	
491.	Borax *	$\text{Na B}^2 + 10\text{H}$	4
492.	Lagonite	$\text{Fe B}^3 + 3\text{H}$	
493.	Larderellite	$\text{NH}^4\text{B}^4 + 4\text{H}$	
494.	Warwickite †	Mg, Fe, Ti, B	4
5. Phosphates, Arsenates, Antimonates, Nitrates.			
a. ANHYDROUS.			
1. Hexagonal.			
495.	Apatite *	$\text{Ca}^3\text{P} + \frac{1}{2}\text{Ca}(\text{Cl, F})$	6
496.	Hydroapatite	$\text{Ca}^3\text{P} + \frac{1}{2}\text{Ca F} + \text{H}$	
497.	Cryptolite	Ca^3P	6
498.	Pyromorphite *	$\text{Pb}^3\text{P} + \frac{1}{2}\text{Pb Cl}$	6
499.	Mimetene *	$(\text{Pb, Ca})^3(\text{As, P}) + \frac{1}{2}\text{Pb Cl}$	6
2. Dimetric.			
500.	Xenotime *	$(\text{Y, Ce})^3\text{P}$	2
3. Monoclinic.			
501.	Monazite *	$(\text{Ce, La, Th})^3\text{P}$	4
502.	Wagnerite	$\text{Mg}^3\text{P} + \text{Mg F}$	4
503.	Kühnrite	$(\text{Ca, Mg, Mn})^3\text{As}$	
504.	Lazulite *	$2(\text{Mg, Fe})^3\text{P} + \text{Al}^2\text{P} + 5\text{H}$	4
505.	Turquois *	$\text{Al}^2\text{P} + 5\text{H}$	
506.	Conarite ?	Ni, P, H	4?

No.	Name.	Formula.	System of crystallization.
<i>4. Trimetric.</i>			
507.	Triphyline *	$(\text{Fe}, \text{Mn}, \text{Li})^3 \text{P}$	3
508.	Triplite	$(\text{Mn}, \text{Fe})^4 \text{P}$	3
509.	Fischerite	$\text{Al}^2 \text{P} + 8\text{H}$	3
<i>Appendix.</i>			
510.	Hopeite	$\text{Zn}, \text{P}, \text{Aq}$	3
511.	Amblygonite *	$(2(\text{Li}, \text{Na})^3 \text{P} + 2\text{Al}^1 \text{P}) + (\text{Al}^2 \text{F}^3 + \text{Al})$	3
512.	Herderite	$\text{Al}, \text{Ca}, \text{P}, \text{F}$	3
513.	Carminite	$\text{Pb}^2 \text{As} + 5\text{Fe As}$	3
514.	Romeine	$\text{Ca}^2, \text{Sb}, \text{Sb}$	2
<i>b. HYDROUS.</i>			
515.	Thrombolite	$\text{Ca}^2 \text{P}^2 + 6\text{H}$?	
516.	Stercorite	$(\text{Na}, \text{NH}^4) \text{P} + 9\text{H}$	
517.	Struvite	$\text{NH}^4 \text{Mg}^2 \text{P} + 12\text{H}$	
518.	Haidingerite	$\text{Ca}^2 \text{As} + 4\text{H}$	3
519.	Pharmacolite	$\text{Ca}^2 \text{As} + 6\text{H}$	4
520.	Vivianite *	$\text{Fe}^2 \text{P} + 8\text{H}$	4
521.	Erythrine *	$\text{Co}^2 \text{As} + 8\text{H}$	4
522.	Hörnesite	$\text{Mg}^2 \text{As} + 8\text{H}$	4
523.	Roesslerite	$\text{Mg}^2 \text{As} + 15\text{H}$	
524.	Annabergite *	$\text{Ni}^2 \text{As} + 8\text{H}$	
525.	Köttigite	$(\text{Zn}, \text{Co}, \text{Ni})^2 \text{As} + 8\text{H}$	4
526.	Symplesite	$3\text{Fe}^2 \text{As}^2 + 8\text{H}$	4
527.	Trichalcite	$\text{Cu}^2 \text{As} + 5\text{H}$	
528.	Scorodite *	$\text{Fe As} + 4\text{H}$	3
529.	Libethenite	$\text{Cu}^2 \text{P} + \text{H}$	3

No.	Name.	Formula.	System of crystallization.
530.	Oliveneite	$\text{Cu}^1(\text{As}, \text{P}) + \text{H}$	3
531.	Conichalcite	$(\text{Cu}, \text{Ca})^4(\text{P}, \text{As}) + 1\frac{1}{2}\text{H}$	
532.	Euchroite	$\text{Cu}^4\text{As} + 7\text{H}$	3
533.	Arseniosiderite	$\text{Ca}^6\text{As} + 4\text{Fe}^2\text{As} + 15\text{H}$	1
534.	Pharmacosiderite	$\text{Fe}^4\text{As}^3 + 18\text{H}$	1
535.	Wavellite *	$\text{Al}^3\text{P}^4 + 12\text{H}$	3
536.	Cacoxene *	$\text{Fe}^2\text{P} + 12\text{H}$	
537.	Childrenite *	$((\text{Mg}, \text{Fe}, \text{Mn})^3, \text{Al})^4\text{P}^2 + 15\text{H}$	3
538.	Erimite	$\text{Cu}^4\text{As} + 2\text{H}$	
539.	Cornwallite	$\text{Cu}^6\text{As} + 5\text{H}$	
540.	Phosphochalcite *	$\text{Cu}^4\text{P} + 2\frac{1}{2}\text{H}$	3
541.	Tagilite	$\text{Cu}^4\text{P} + 3\text{H}$	
542.	Tyrolite	$\text{Cu}^4\text{As} + 10\text{H} + \text{CaO}$	3
543.	Devauxene	$\text{Fe}^2\text{P} + 24\text{H}$	
544.	Dufrenite *	$\text{Fe}^2\text{P} + 2\frac{1}{2}\text{H}$	3
545.	Aphanosite	$\text{Cu}^4\text{As} + 3\text{H}$	4
546.	Chalcophyllite	$\text{Cu}^4\text{As} + 12\text{H}$	6
547.	Liroconite	$5\text{Cu}^4\text{As} + \text{Al}^3\text{P} + 75\text{H}$	4
548.	Uranite *	$(\text{Ca}, \text{U}^4)\text{P} + 12\text{H}$	3
549.	Chalcolite	$(\text{Cu}, \text{U}^4)\text{P} + 8\text{H}$	2
550.	Carphosiderite	$\text{Fe}_2\text{P}, \text{H}$	
551.	Plumbo Resinite	$\text{Pb}^3\text{P} + 6\text{AlH}$	
552.	Calcoferrite	$6(\text{Ca}, \text{Mg}), 3(\text{Al}, \text{Fe}), 4\text{P}, 20\text{H}$	
<i>Sulphato-Phosphates.</i>			
553.	Pitticite <i>Haus</i> *	$\text{Fe}^2\text{S}^2 + 2\text{FeAs} + 24\text{H}$	
554.	Diadochite	$\text{Fe}^2\text{P}^2 + 2\text{FeS}^2 + 36\text{H}$	

No.	Name.	Formula.	System of crystallization.
<i>Appendix.</i>			
555.	Lindackerite?	$2\text{Cu}^2\text{As} + \text{Ni}^3\text{S} + 8\text{H}_2\text{O}$	3
<i>c. Nitrates.</i>			
556.	Nitrammite *	NH_4^+NO_3	
557.	Nitre *	KNO_3	3
558.	Nitratine	NaNO_3	6
559.	Nitrocalcite *	$\text{CaNO}_3 + \text{H}_2\text{O}$	
<i>6. Carbonates.</i>			
<i>1. Anhydrous Carbonates.</i>			
560.	Calcite *	CaO	6
561.	Magnesite *	MgO	
562.	Dolomite *	$(\text{Ca}, \text{Mg})\text{O}$	6
563.	Breunnerite	$(\text{Mg}, \text{Fe}, \text{Mn})\text{O}$	
564.	Chalybite *	FeO	6
565.	Diallogite *	MnO	6
566.	Smithsonite *	ZnO	6
567.	Aragonite *	CaO	3
568.	Witherite	BaO	3
569.	Strontianite *	SrO	3
570.	Bromlite	$\text{BaO} + \text{CaO}$	3
571.	Manganocalcite	$\text{MnO}, \text{FeO}, \text{CaO}, \text{MgO}$	3?
572.	Cerusite *	PbO	3
573.	Barytocalcite	$\text{BaO} + \text{CaO}$	4
<i>2. Hydrous Carbonates.</i>			
574.	Bicarbonate of Ammonia	$\text{NH}_4^+\text{CO}_3 + \text{H}_2\text{O}$	
575.	Trona *	$\text{Na}_2\text{CO}_3 + 4\text{H}_2\text{O}$	4

No.	Name.	Formula.	System of crystallization.
576.	Thermonatrite	$\text{Na} \text{O} + \text{H}$	3
577.	Natron *	$\text{Na} \text{O} + 10\text{H}$	4
578.	Gay-Lussite	$\text{Na} \text{O} + \text{Ca} \text{O} + 5\text{H}$	4
579.	Lanthanite *	$\text{La} \text{O} + 3\text{H}$	3
580.	Hydromagnesite *	$\text{Mg}^4 \text{O}^2 + 4\text{H}$	4
581.	Hydrocalcite	$\text{Ca} \text{O} + 5\text{H}$	6
582.	Malachite *	$\text{Cu}^2 \text{O} + \text{H}$	4
583.	Azurite *	$2\text{Cu} \text{O} + \text{Cu} \text{H}$	4
584.	Aurichalcite *	$2(\text{Zn}, \text{Cu}) \text{O} + 3(\text{Zn}, \text{Cu}) \text{H}$	
585.	Zinc Bloom *	$\text{Zn}^2 \text{O} + 3\text{H}$	
586.	Emerald Nickel *	$\text{Ni}^2 \text{O} + 6\text{H}$	
587.	Remingtonite †	$\text{Co} \text{O} + \text{Aq}$ †	
588.	Zippeite *	$\text{Cu}^2 \text{S}^2 + 12\text{H}$ and $\text{Cu}^2 \text{S}^2 + \text{Cu} \text{S} + 12\text{H}$	
589.	Liebigite	$\text{Cu} \text{O} + \text{Ca} \text{O} + 20\text{H}$	
590.	Voglite	$2\text{U} \text{O} + \text{Ca} \text{O} + \text{Cu}^2 \text{O}^2 + 14\text{H}$	
591.	Bismutite *	$\text{Bi}^4 \text{O}^2 \text{H}^4$	

3. Carbonates with a Chloride or Fluoride.

592.	Parisite	$8(\text{Ce}, \text{La}, \text{D}) \text{O} + 2\text{CaF} + (\text{Ce}, \text{La}, \text{D}) \text{H}^2 \text{O}$
593.	Kischthimitie	$3\text{La} \text{O} + \text{Ce}^4 (\text{Fl}, \text{O})^2 + \text{H}$
594.	Cerasine	$\text{Pb} \text{Cl} + \text{Pb} \text{O}$

7. Oxalates.

595.	Whewellite	$\text{Ca} \text{O} + \text{H}$	4
596.	Oxalite	$2\text{Fe}^2 \text{O} + 3\text{H}$	
597.	Thierschite	Ca, O	

No.	Name.	Formula.	System of crystallization.
E. RESINS AND ORGANIC COMPOUNDS.			
598.	Amber *	$C^{10}H^8O$	
599.	Copaline	$C^{10}H^{12}O$	
600.	Middletonite	$C^{10}H^{10} + H$	
601.	Retinite *		
602.	Scleretinite	$C^{10}H^7O$	
603.	Guyaquillite	$C^{10}H^{10}O^2$	
604.	Piauzite		
605.	Walchowite	$C^{12}H^9O$	
606.	Bitumen *	C^8H^6	
607.	Idrialine	$C^{12}H^{14}O$	
608.	Pyropissite		
609.	Brewstoline	$O?$	
610.	Elaterite *	C, H	
611.	Scheererite	$C H^2?$	4
612.	Könlite	C^4H	
613.	Fichtelite	C^4H^2	4
614.	Könleinite	$C^{10}H^{10}$	
615.	Hartite	C^6H^4	4
616.	Hartine	$C^{10}H^{17}O^2$	8
617.	Ixolyte		
618.	Hatchettine	C, H	
619.	Ozocerite	C, H	
620.	Chriamantine		
621.	Dopplerite.	$C^8H^6O^6$	

No.	Name.	Formula.	System of crystallization.
622.	Dinite		
623.	Hircine		
624.	Jaulingite		
625.	Melanchyme		
626.	Anthracoxene		
627.	Baikerite		
628.	Krantzite		
629.	Mellite	Al ₂ M ³⁺ + 18H ⁻	2

CHECK LIST OF MINERALS.

1. Gold *	30. Orpiment *	63. Onofrite
2. Platinum *	31. Dimorphine	64. Copper Nickel *
3. Platiniridium *	32. Bismuthine *	65. Breithauptite *
4. Palladium	33. Stibnite *	66. Kaneite
5. Quicksilver	34. Discrasite	67. Schreibersite
6. Amalgam	35. Domeykite *	68. Pyrites *
7. Arquerite	36. Algodonite *	69. Hauerite
8. Gold Amalgam *	37. Whitneyite *	70. Smaltine *
9. Silver *	38. Silver Glance *	71. Cobaltine
10. Bismuth Silver	39. Erubescite *	72. Gersdorffite *
11. Copper *	40. Galena *	73. Ullmannite
12. Lead	41. Steinmannite	74. Marcasite *
13. Iron	42. Cuproplumbite ?	75. Rammelsbergite
14. Tin	43. Alisonite	76. Leucopyrite *
15. Zino	44. Manganblende	77. Mispickel *
16. Iridosmine *	45. Syepoorite	78. Glaucodot
17. Tellurium	46. Eisennickelkies	79. Sylvanite *
18. Bismuth *	47. Clausthalite	80. Nagyagite
19. Tetradyomite *	48. Naumannite	81. Covellite
20. Antimony	49. Berzelianite	82. Molybdenite *
21. Arsenic *	50. Eucairite	83. Riolite
22. Arsenical Anti-	51. Hessite *	84. Skutterudite
23. Sulphur * [mony *	52. Altaite	85. Linnaeite *
24. Selenium	53. Grünauite	86. Cuban
25. Selensulphur	54. Blende *	87. Chalcopyrite *
26. Diamond *	55. Copper Glance *	88. Barnhardite *
27. Mineral Coal	56. Akanthite	89. Tin Pyrites
27. Anthracite *	57. Stromeyerite	90. Sternbergite
27. Bituminous	58. Cinnabar *	91. Wolfsbergite
27. Jet * [Coal *	59. Millerite *	92. Tannenite
27. Lignite *	60. Pyrrhotine *	93. Berthierite
28. Graphite *	61. Greenockite	94. Zinkenite
29. Realgar	62. Wurtzite	95. Miargyrite

CHECK LIST OF MINERALS.

96. Plagionite	142. Tachhydrite	188. Völknerite *
97. Jamesonite	143. Periclaste	189. Hydrotalcite
98. Heteromorphite	144. Red Copper *	190. Psilomelane *
99. Brongniardite	145. Martite *	191. Newkirkite
100. Chiviatiite	146. Iserine	192. Wad *
101. Dufrenoysite	147. Irite ?	193. Atacamite
102. Pyrargyrite	148. Spinel *	194. Arsenolite *
103. Proustite *	149. Magnetite *	195. Senarmontite
104. Freieslebenite *	150. Magnoferrite	196. Valentinite
105. Bournonite	151. Franklinite *	197. Bismuth Ochre *
106. Kennettite	152. Chromic Iron *	198. Kermesite
107. Boulangerite	153. Pitchblende	199. Retzbanite
108. Aikinite	154. Melaconite *	200. Cervantite
109. Wölkite	155. Plumbic Ochre *	201. Volgerite
110. Clayite ?	156. Water *	202. Ammiliolite
111. Kobellite ?	157. Zincite *	203. Sulphurous Acid
112. Meneghinite	158. Corundum *	204. Telluric Ochre
113. Tetrahedrite *	159. Hematite *	205. Sulphuric Acid *
114. Tennantite *	160. Ilmenite *	206. Wolframite *
115. Geocrontite *	161. Plattnerite	207. Molybdate *
116. Polybasite	162. Tenorite	208. Carbonic Acid *
117. Stephanite	163. Braunitite *	209. Sassolin
118. Enargite *	164. Hausmannite *	210. Quartz *
119. Xanthoconite	165. Cassiterite *	210 ^a . Jasper *
120. Fireblende	166. Rutile *	210 ^b . Agate *
121. Wittichite	167. Anatase *	210 ^c . Chalcedony *
122. Calomel	168. Chalcotrichite *	211. Opal *
123. Sylvine	169. Chrysoberyl *	211 ^a . Precious opal
124. Salt *	170. Brookite *	211 ^b . Semi-opal *
125. Sal Ammoniac	171. Pyrolusite *	211 ^c . Hyalite
126. Kerargyrite	172. Pollanite	211 ^d . Geysiterite
127. Embolite	173. Minium *	212. Edelforsite
128. Bromyrite	174. Crednerite	213. Wollastonite *
129. Iodo-bromid of	175. Heteroclin	214. Pyroxene
130. Fluor * [Silver	176. Palladinite ? *	214 ^a . Diopside *
131. Yttrocerite *	177. Voltzite	214 ^b . Hedenbergite *
132. Iodyrite	178. Matlockite	214 ^c . Augite *
133. Coccinitite	179. Mendipite	215. Pelicanite
134. Fluocerite	180. Perclyite ?	216. Spodumene *
135. Fluocerine	181. Karelinitite ?	217. Prehnitoid
136. Cotunnite	182. Diaspore *	218. Amphibole
137. Muriatic Acid	183. Göthite *	218 ^a . Tremolite *
138. Cryolite	184. Manganite	218 ^b . Actinolite *
139. Chiolite	185. Limonite *	218 ^c . Hornblende *
140. Fluellite	186. Brucite *	219. Acmite
141. Carnallite	187. Gibbsite *	220. Strakonitzite ?

221. Enstatite	255. Danburite †	301. Meerschaum
222. Anthophyllite *	256. Axinite *	302. Neolite
223. Hypersthene *	257. Iolite *	303. Spadaite
224. Wichtyne	258. Muscovite *	304. Chlorophæite
225. Babinthonite *	259. Phlogopite *	305. Crocidolite
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